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ABSTRACT

This paper describes the development of a campus wide information system (CWIS) at Metropolitan State College of Denver (MSCD) in Colorado. The paper discusses the background of the college, its computing environment, interactive voice response system, and information technology plan. The CWIS was first implemented on gopher. Gopher was straightforward and easy to use, but lacked "pizzazz" because it is a text-only system and lacked hypertext capability (the ability to select a key word which links to another document or site). The World Wide Web provides excellent graphics and hypertext capabilities. The combined utilization of the Web and gopher are discussed. In the end, gopher was discontinued in favor of exclusive Web usage. "Lynx," a text-based Web browser, was installed for dial-in users with text capability only. Main issues faced in the implementation of the CWIS include: lack of top level awareness and support; selection of pictures and use of logos for the main college home page; appropriate use or misuse of student home pages; need for policies and an oversight committee; and faculty training when faced with limited resources. (SWC)

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MSCD's DEVELOPMENT OF A CAMPUS WIDE INFORMATION SYSTEM ON THE WORLD WIDE WEB

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BACKGROUND

THE COLLEGE

Metropolitan State College of Denver (MSCD) is one of the nation's premier urban colleges, educating more Coloradans than any other institution of higher education in the state. Since the college was founded in 1963 as part of The State Colleges of Colorado, MSCD has grown to a current enrollment of about 17,500 students, awarded degrees to nearly 27,000 graduates, and delivered educational programming to approximately 220,000 people.

Metro tends to be "second chance" institution for a significant portion of the student body. That is, many of Metro's students arrive as transfer students from other colleges, frequently with several years having elapsed between attendance at their former college and their entrance to Metro. As a result, Metro's students tend to be older, part of the local work force, and, frequently, they attend part-time. Hence the greater need to access information at off-hours and off-campus.

Located in downtown Denver, the college shares the campus with the University of Colorado at Denver, the Community College of Denver, and Auraria Higher Education Center. AHEC (Auraria Higher Education Center) is an institution to provide common administrative services such as mailing or purchasing for 3 schools, as well as to manage the shared facilities such as a student center, telephone switch, parking space, buildings, and other facilities.

MSCD is a comprehensive academic institution, granting bachelor of arts, bachelor of fine arts, and bachelor of science degrees, offering more than 2,000 course sections during the fall and spring semesters. Students can choose from 50 majors and 68 minors offered through three schools: Business; Letters, Arts and Sciences; and Professional Studies. Programs range from the traditional disciplines, such as accounting and teacher licensure, to contemporary fields of study, such as drug abuse counseling and entrepreneurship. Unique majors for Coloradans include aerospace science, criminal justice, human services, and land use.

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MSCD's emphasis is on teaching. All classes are taught by professors, not graduate assistants. The college's more than 325 full-time faculty are teachers first. Many have extensive professional backgrounds, with more than 88 percent having doctorates or the highest level of academic degrees attainable in their fields. Part-time faculty work in the metro Denver community and bring to the classroom their expertise in business, law, politics, communications, science, technology, and the arts. Small classes (the average class size is 22) ensure students greater access to faculty, a highly interactive atmosphere, and a personalized learning experience.

COMPUTING ENVIRONMENT

MSCD's administrative computing environment consists of a centralized computing environment and a client/server computing environment.

In the centralized computing environment, the host is a Hitachi Data System EX-27 with the MVS/ESA 4.2.2 operating system. Most of the existing on-line and batch administrative application systems are running on the host with data in ADABAS and VSAM files. A user can access the application systems from a PC with 3270 emulation that is connected to an IBM 3745 communication controller through the campus wide network. The current interactive voice response unit is connected directly to the 3745 communication controller with 2 SDLC lines.

In the client/server computing environment, there are a few Intel processor-based database servers and an image server. A few application systems are running on the servers with data in Microsoft SQL Server. A user can access the application system from a PC with the client portion of the application system. The network operating system is Banyan Vines 6.2 and provides mainly file, printer, electronic mail, and host access services to the connected PCs.

The college decided last year to purchase and implement a suite of administrative application products based on the client/server technology. The Banner system of SCT (Systems & Computer Technology Corporation) was selected early this year for MSCD's new administrative application systems.

In the new client/server computing environment, there will be a few UNIX based ORACLE database servers with the server portion of the Banner system and associated databases. In the client side, the client portion of the Banner system will be running on a PC with Windows operating system or on a MAC.

The Banner system will provide the interface to an interactive voice response system through a VT terminal emulation technique.

INTERACTIVE VOICE RESPONSE (IVR) SYSTEM

MSCD is operating a Periphonics VPS 7500 with 60 analog telephone lines from US West and 4 analog telephone lines from the AHEC switch.

Major IVR applications are student class registration and payment, grade reporting, financial aid information, and school orientation information. These IVR applications communicate with the application systems on the mainframe using a 3270 screen emulation technique.

INFORMATION TECHNOLOGY PLAN

A long-range plan for information technology at Metro was adopted in early 1991. This plan established a ten-year vision for information technology for the College, with emphasis in the first few years on building the network and computing infrastructure necessary to support the uniqueness of the institution. As a result of the IT Plan, a campus-wide fiber optic backbone was implemented; building premise wiring, using 10 base T architecture, was installed to link the desktop to the campus backbone; desktop computers, both PC (about 80%) and Macintosh, were procured for faculty and staff; Banyan Vines was installed as the network operating system; and a campus-wide electronic messaging strategy was implemented. This set the expectation for highly functional, user friendly, desktop applications -- the complete antithesis of Metro's mainframe-based, administrative application systems.

CAMPUS WIDE INFORMATION SYSTEM

GOPHER

I was hired in October 1994 and asked to implement a Campus Wide Information System (CWIS) on gopher. The technical services staff said they would download the gopher software from Minnesota and install it on the UNIX-based HP 9000 computer by the first of November. During that month I went looking for data to put out on the gopher. I found the College Catalog. A student doing a project for a Computer Science class had loaded the Catalog's original WordPerfect documents onto the Lotus Notes server. I spent time extracting documents, ftp'ing them to the UNIX computer and editing them to look good as ASCII text. Another source of information came from the Banyan Mail system. Staff and faculty are in the habit of sending email announcements of special events, athletic events, kudos, graduation announcements to everyone on the Banyan mail system. I would call the person sending the email, explain the gopher CWIS and ask permission to post their email. This gave me information to post and also gave some exposure to the gopher. I developed a colorful, tri-fold brochure to be sent out to all faculty and staff on campus when gopher was live on November 1. The hardest part was getting exposure. I found allies in two key people. One person, the supervisor of the student computer labs, is also the person who trains new faculty and staff in use of the computers, Banyan mail and Internet usage. He would discuss gopher and demo MSCD's in his classes. Another key person was a Program Administrator in the Student Health Center who does sexual disease awareness counseling for students. She speaks at all student orientation sessions and after discovering the mounds of information on gopher, especially the Centers for Disease Control, she would take my brochures and include them in her handouts. She also carried a stuffed gopher in her bag that she would pull out and use to introduce her discussions.

Gopher was wonderful. The software is free from the University of Minnesota. It is straight forward with its directory/menu structure. All one needs to do is save the document to be posted in ASCII text format, ftp it to the proper gopher directory, and it appears on the menu. Gopher is easy. "Non-techies" can do the work. It is also easy to empower users to post their own information. Basically, they need to be given access to "their" gopher directory and shown how to ftp a file to that directory.•

Gopher has two major drawbacks: its lack of pizzazz and its lack of hypertext capability (hypertext is the ability to select a key word and it links to another document or site). Gopher is straight text: no graphics, no bolding, no italicizing, no underlining. It gets the information out on the Internet and was great until the advent of the World Wide Web (WWW). While the number of hosts and users of the WWW has been growing at astounding rates, the number of gopher users has continually declined. However, many institutions have a large amount of time invested in gopher. Web browsers can view gopher documents so there has not been much incentive to redo gopher documents into Web coded documents. One can implement a Web server and still maintain the gopher. Do you then post some documents on the Web and some on gopher? Or post all on gopher and use the Web as a graphical front end to ASCII text documents? It is one-half of a solution. However, the gopher documents still cannot use the hypertext capability that is so useful and popular with the Web.

Another question to ask is what types of access do most students, faculty and staff have from off-campus. Does your school provide SLIP or PPP? Do off-campus users subscribe to a commercial vendor such as America On Line or Compu Server? MSCD does not support SLIP or PPP. Most of the dial in users had text-only capability and were using gopher.
The approach I used was to continue posting documents to the gopher and to develop the Web in my spare time. (The Web would be the graphical front end.) The Web was so different and fun that it was not hard to find the time to investigate and develop it for MSCD. The hardest part was continuing the gopher. As Web development started a decision had to be made as to which Web server (NCSA or CERN) to use. One of the other schools on the Auraria campus (University of Colorado at Denver) was using NCSA's and could offer us their knowledge, however, our technical staff decided upon CERN's server because Cern is where the WWW project started. •

An official MSCD home page on the Web was announced March 1, 1995. At this time I was working full time on the CWIS and had 1 part-time student helping. The student's main job duties were to "surf the Web" looking for new and interesting sites, to learn html coding, and to look for and analyze scripts for forms, free software for server statistics, and search engines. In May 1995 another part-time student was hired with the same job duties.
As our html expertise developed we found we were double posting documents: once on the gopher and again on the Web. After several months of doing this, I made the decision to discontinue gopher, post only to the Web and install "lynx" for dial-in users with text capability only. Lynx is a text-based Web browser developed by the University of Kansas. It is also free software. Users dial-in and logon to their UNIX account and at the prompt type "lynx." They see the text only version of the Web. Instead of the point and click capability of graphical browsers, lynx uses arrow keys to navigate through documents and around the

world. In October, I announced to the campus that gopher would be discontinued at the end of the semester in December. There were some faculty who were teaching the Internet through gopher and some User Support staff that voiced concern. After having them surf Netscape and use lynx they agreed to our gopher's demise.
Also at the end of the semester the Technical Services staff was shutting down the UNIX-based HP 9000 computer and moving all user accounts and software to a new DEC ALPHA machine. I decided that as long as a move was taking place we should look at changing to the Netscape server which is free to educational users. User Services staff had been installing the Netscape browser on faculty and staff PCs as the browser of choice. By January 1996 all the PCs and MACs in the student labs had Netscape loaded on them. Knowing that Netscape has a secure Commerce Server with encryption capability, I wanted us to be in a position to utilize this capability. I could picture students having the desire and capability to pay tuition and fees and admissions form processing fees on-line with a credit card number. •

ISSUES

The major problem I have faced with the Campus Wide Information System at Metro has been the lack of top level awareness. My supervisor and the Associate Vice President of Information Technology felt a CWIS was an important step for the institution. However, I asked for a CWIS Oversight Committee with high level members, including the College Attorney, representatives from Public Relations, Academic Affairs, faculty and students. This Committee is to be responsible for the top level menus, policy statements and publishing guidelines, and content questions and disputes. (As of the writing of this article I still do not have a committee in place.) I took the approach that I would continue to put information on the CWIS and continue contacting people to obtain information. If questions arose I would handle them or pass them on to the appropriate area.

With the gopher, the President and Vice Presidents knew it existed and that was the extent of their interest. With the Web more knowledge and interest have been generated, mainly I believe, because of the graphics. As an example, when the Web was installed, I wanted the President's picture on-line. User Services loaded Netscape on her PC so she could view and approve her picture. In the President's convocation speech at the beginning of the school year in August, she mentioned that she has "surfed the Web" and her picture is even on it.

Some of the main concerns and questions have been on the choice of pictures for the main College home page. College Communications/Publications has been concerned over the use and non-use of the official Corporate logo. For a while we had a picture of a historic landmark on campus -- a church. One high level administrator "heard" of the picture and without viewing the Web site suggested it might not be appropriate because we are not religiously affiliated.

Appropriate use or misuse of student home pages has generated some awareness among higher level administrators. As students develop home pages we have found one that was commercial in nature and another that was questionable as to pornographic content. These have generated discussion as to the need for policies and an oversight committee. A

committee and draft policies are being considered at this time.
Metro has purchased 4 kiosks to place at various locations on campus. These kiosks will have high level visibility. Students and visitors will be able to obtain all the campus information, plus use a phone to call an office directly, pay bills with a credit card, fax items, and print out grades, schedules, unofficial transcripts, etc. These kiosks will increase the awareness of the Campus Wide Information System.

Another issue we are beginning to face is training. As more faculty are becoming aware of the Web they are wanting to build home pages. With one full-time person and two or three part-time students it is difficult to maintain information, expand the content, stay abreast of the new developments, and train. Originally I thought if I trained some staff members they would do their home page and then could train others. It has not worked. Some staff or faculty are capable of helping others. The majority just have time and talent to get their own home page done. We have put training materials on-line. This has worked well for some people, but, again, not for the majority -- they want individualized training. This is an issue I am still trying to solve. Maybe as we create our Campus Information System and gain the awareness we are trying so hard to get, we are creating our own "monster." Or maybe it's just "job security."